

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/866,596	RAJAN, JEBU JACOB	
	<b>Examiner</b>	<b>Art Unit</b>	
	Huyen X. Vo	2655	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/10/2005.
2. ☒ The allowed claim(s) is/are 1-47,49-53,56-73,75 and 76.
3. ☒ The drawings filed on 30 May 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                     | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

**DETAILED ACTION**

**EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Mark A. Williamson on 7/26/2006. The application has been amended as follows:

**Claims 48 and 74 have been cancelled.**

**Claims 49-50 and 75-76 have been amended as follows:**

49. An apparatus for determining sets of parameter values representative of an input speech signal, the apparatus comprising:

means for receiving a plurality of speech signal values representative of a speech signal generated by a speech source as distorted by a transmission channel between the speech source and the receiving means;

means for dividing the plurality of speech signal values into a succession of groups of speech signal values; and

means for processing the speech signal values in each group to determine a set of parameter values representative of the speech signal values in the group;

wherein said processing means comprises:

a memory for storing data defining a predetermined function which gives, for a set of speech signal values of a group, a probability density for parameters of a predetermined signal model including a first part having first parameters which models said source and a second part having second parameters which models said channel, with the predetermined signal model assumed to have generated the speech signal values in the group, the probability density defining, for a given set of parameter values, the probability that the predetermined signal model has those parameter values, given that the model is assumed to have generated the speech signal values in the group;

means for applying the set of speech signal values of a current group to said stored function to give the probability density for said model parameters for the current group;

means for processing said function to derive samples of parameter values from said probability density for the current group;

means for evaluating said probability density for the current group using one or more of said derived samples of parameter values for different numbers of parameter values to determine respective probabilities that the predetermined signal model has those parameter values; and

means for processing at least some of said derived samples of parameter values and said evaluated probabilities to determine model parameters that are representative of the set of signal values in the current group.

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50. An audio comparison apparatus comprising:

a memory for storing a predetermined function which gives, for a given set of audio signal values, a probability density for parameters of a predetermined audio model including a first part having first parameters which models said source and a second part having second parameters which models a transmission channel, with the predetermined audio model assumed to have generated the set of audio signal values, the probability density defining, for a given set of model parameter values, the probability that the predetermined audio model has those parameter values, given that the model is assumed to have generated the set of audio signal values;

means for receiving a set of audio signal values representative of an audio signal generated by the audio source as distorted by the transmission channel between the audio source and the receiving means;

means for applying the set of received audio signal values to said stored function to give the probability density for said model parameters for the set of received audio signal values;

means for processing said function, with said set of received audio signal values applied, to derive samples of parameter values from said probability density;

means for analysing at least some of said derived samples of parameter values to determine parameter values that are representative of the set of received audio signal values; and

means for comparing said determined parameter values with pre-stored parameter values to generate a comparison result.

75. An apparatus for determining sets of parameter values representative of an input speech signal, the apparatus comprising:

a receiver operable to receive a plurality of speech signal values representative of a speech signal generated by a speech source as distorted by a transmission channel between the speech source and the receiver;

a divider operable to divide the plurality of speech signal values into a succession of groups of speech signal values; and

a processor operable to process the speech signal values in each group to determine a set of parameter values representative of the speech signal values in the group; wherein said processor comprises:

a memory operable to store data defining a predetermined function which gives, for a set of speech signal values of a group, a probability density for parameters of a predetermined signal model including a first part having first parameters which models said source and a second part having second parameters which models said channel, with the predetermined signal model assumed to have generated the speech signal values in the group, the probability density defining, for a given set of parameter values, the probability that the predetermined signal model has those parameter values, given that the model is assumed to have generated the speech signal values in the group;

an applicator operable to apply the set of speech signal values of a current group to said stored function to give the probability density for said model parameters for the current group;

a first sub-processor operable to process said function to derive samples of parameter values from said probability density for the current group;

an evaluator operable to evaluate said probability density for the current group using one or more of said derived samples of parameter values for different numbers of parameter values to determine respective probabilities that the predetermined signal model has those parameter values; and

a second sub-processor operable to process at least some of said derived samples of parameter values and said evaluated probabilities to determine model parameters that are representative of the set of signal values in the current group.

76. An audio comparison apparatus comprising:

a memory operable to store a predetermined function which gives, for a given set of audio signal values, a probability density for parameters of a predetermined audio model including a first part having first parameters which models an audio source and a second part having second parameters which models a transmission channel, with the predetermined audio model assumed to have generated the set of audio signal values, the probability density defining, for a given set of model parameter values, the probability that the predetermined audio model has those parameter values, given that the model is assumed to have generated the set of audio signal values;

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a receiver operable to receive a set of audio signal values representative of an audio signal generated by the audio source as distorted by the transmission channel between the audio source and the receiver;

an applicator operable to apply the set of received audio signal values to said stored function to give the probability density for said model parameters for the set of received audio signal values;

a processor operable to process said function, with said set of received audio signal values applied, to derive samples of parameter values from said probability density;

an analyser operable to analyse at least some of said derived samples of parameter values to determine parameter values that are representative of the set of received audio signal values; and

a comparator operable to compare said determined parameter values with pre-stored parameter values to generate a comparison result.

### ***Allowable Subject Matter***

2. Claims 1-47, 49-53, 56-73, and 75-76 are allowed over prior art of record. The following is an examiner's statement of reasons for allowance: Haimi-Cohen (US 6374221) discloses a method for automatically retraining of a speech recognizer during its normal operation in that stored trained models are retrained on the basis of recognized user utterances. Feature vectors, model state transitions, and tentative recognition results are stored upon processing and evaluation of speech samples of the

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user utterances. Based on the history of user's usage behaviors, the recognition result (or results) are determined to be uncertain and deemed not to be suitable for updating a model, or updating is performed with appropriate weighting to take into effect the level of uncertainty (*see reference*). Handel et al. (US 6324502) disclose a method for enhancing speech in that noisy speech parameters are enhanced by determining a background noise power spectral density (PSD) estimate, determining noisy speech parameters, determining a noisy speech PSD estimate from the speech parameters, subtracting a background noise PSD estimate from the noisy speech PSD estimate, and estimating enhanced speech parameters from the enhanced speech PSD estimate (*see Handel reference*). Both prior art references fail to specifically disclose a memory for storing data defining a predetermined function derived from a predetermined signal model which includes a first part having first parameters which models said source and a second part having second parameters which models said channel said function being in terms of said first and second parameters and in terms of a set of speech signal values and generating, for a given set of received signal values, a probability density function which defines, for a given set of first and second parameters, the probability that the predetermined signal model has those parameter values, given that the signal is assumed to have generated the received set of signal values. Furthermore, it would have not been obvious to combine/modify prior art of references to obtain the claimed invention. Therefore, claims 1-47, 49-53, 56-73, and 75-76 are allowed over prior art of record.



Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen X. Vo whose telephone number is 571-272-7631. The examiner can normally be reached on M-F, 9-5:30.

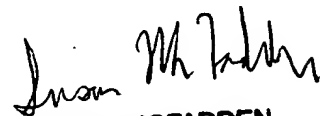
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HXV

8/1/2005

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**SUSAN MCFADDEN**  
**PRIMARY EXAMINER**